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A survey on goat production in a semi-arid smallholder farming area situated in the north of Zimbabwe

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A survey was carried out to evaluate goat production in a crop-livestock farming area in the north of Zimbabwe. The objectives of the study were to determine goat production systems and productivity. Qualitative information was obtained using participatory rural appraisal techniques (PRA) while quantitative data was obtained through administration of a structured questionnaire to 317 households. The major finding of the survey indicated that the predominant goat breed found was the “small” indigenous Mashona goat. The goats were reared exclusively through extensive foraging during the dry season but were herded, tethered or a combination was used during the cropping season. Flock sizes were small, averaging 12 goats/household resulting in few goats available for sale or slaughter. All goat sales were informal. Ninety one percent of farmers indicated interest in cross breeding Mashona does with Boer bucks to improve the size of the Mashona.

Keywords: Mashona goat, production, smallholder farming, marketing.

Introduction

Following poultry, goats are the second most numerous livestock species kept by smallholder farmers in Zimbabwe today. The most recent national livestock census estimates the goat population in the country to exceed 5 million (Central Statistical Office: CSO, 2000). Approximately 97 to 99 percent of these goats are found in the communal areas (Kusina, *et al.*, 1999). Furthermore, the communal areas are habitat to more than 70 percent of Zimbabwe's human population. In these communal areas, goats contribute to household protein intake, are an immediate source of ready income, and play important socio-cultural roles (Co-ordinated Agricultural Research Development: CARD, 1992; Kusina and Kusina, 1998). In addition, goats also provide manure for use in the crop fields and small horticulture gardens, and skins for making mats (Scoones, 1992).

Despite the numerous goats in the communal areas, they continue to play a secondary role to crops in the sustaining the livelihood of most rural communities of Zimbabwe (Kusina, *et al.*, 1999), particularly in integrated crop-livestock farming

systems. As a result, little research information exists about goat production under smallholder farmers' management. Such information is vital and might be useful in order to develop strategies and technologies to enhance sustainable goat production in communal areas as a way to improve food security and the livelihood of the resource-poor smallholder farmers.

Some recent research findings have shown that virtually any member of the family can own goats in rural communities of Zimbabwe (Kusina and Kusina, 2000). This observation makes the goat ideal livestock to target for development and research activities to improve the livelihood of the rural households. The major advantages of the goat over other livestock species include exceptional adaptability, hardiness, short generation interval and general acceptability across cultures and religions (International Livestock Research Institute: (ILRI), 1998). Therefore, the objectives of this study were to determine goat production systems, productivity under smallholder farmer management and contribution to household food security as indicated by slaughters for household meat consumption and as a source of income through sales.

Materials and Methods

Site description

The study was conducted in the Dande Valley in the Lower Guruve and Muzarabani Districts of Mashonaland Central Province from November 1999 to February 2000. The details on description of the study site were reported earlier (Kusina and Kusina, 2000). Briefly, the study site lies between 29° E and 31° E; and 18° S and 20° S. Temperatures are generally high, with daytime temperatures exceeding 30° C throughout the year. The area receives low and erratic rainfall ranging from 400 to 600 mm *per annum*. The rain falls mainly during the wet season stretching from November to April. The rest of the year is generally dry and livestock depend on the perennial Dande River and scattered boreholes for watering. The vegetation is mainly open savannah grassland with acacia trees that include *Acacia tortilis*, *A. gerrarii*, *A. nilotica* and *Dichrostachys cinerea*. In addition, the site is bordered by hills and mountains that have expansive resources of browse shrubs and trees.

Data collection

Qualitative data were obtained using PRA techniques as outlined by Chambers (1993). The main PRA tools used included pairwise ranking, scoring, calendars, diagramming and focus group discussions (Chambers, 1993). In addition, a formal survey was conducted using a structured questionnaire. The questionnaire was administered to 317 households chosen at random from a total of eight wards in the two districts. The information obtained using the questionnaire included goat production data such as animal numbers, productivity levels, diseases and mortality, goat sales, slaughters and general management systems.

Statistical analyses

Analysis of survey data was done using the Statistical Package for Social Scientists (SPSS, 1999). Other data were depicted and summarised as frequencies and descriptive statistics showing means and variance estimates computed using SPSS.

Results*Breeds and management systems*

All farmers in the study kept the indigenous goat breed called the Mashona. Less than 2 percent of farmers reared Boer goats. Ninety one percent of farmers expressed interest in cross breeding Mashona goat does with Boer goat bucks. All the goats were managed using the traditional systems of management (Table 1). During the dry season, 99 percent of goat flocks were foraging freely whereas during the wet or cropping season, 68 percent of the goat flocks were herded (Table 1).

Table 1: Goat husbandry management systems used by farmers.

Husbandry method	¹ Dry season		² Wet season	
	³ Frequency	Percent	Frequency	Percent
Extensive foraging	315	99	26	8
Confined	1	*	11	4
Tethered	*	*	21	7
Herded	1	*	217	68
⁴ Others	*	*	42	13

¹Dry season: May to October.

²Wet season: cropping season (November to April).

³Frequency: total number of respondents.

⁴Others: combinations of the four major methods.

* zero or less than 1 percent.

Flock productivity

The mean flock composition is shown in Table 2. Flock sizes were small, 12 ± 0.7 (mean \pm SE) goats per household. On average, does were reported to have their first kids at the age of 10 ± 0.2 months (mean \pm SE) and overall flock fecundity was 1.8 ± 0.03 (mean \pm SE) (Table 3). In addition, PRA data indicated that the goats kidded throughout the year with two distinct kidding peaks being observed, one between September and November and the second peak, occurring between March and May. Although disease was not considered a major limitation to goat production, during the wet season, some of the goats were affected by orf, foot rot, pneumonia and diarrhoea.

Table 2: Overall goat flock composition (mean \pm SE) per household during the period 1999/2000.

Goat class	Mean \pm SE ¹
² Breeding female	5.3 \pm 0.29
Breeding male	0.8 \pm 0.07
Castrated male	0.3 \pm 0.06
Rearing male	0.8 \pm 0.09
³ Rearing female	2.0 \pm 0.15
Male kid	1.3 \pm 0.10
⁴ Female kid	1.5 \pm 0.13
Total	12 \pm 0.70

Total number of respondents = 317.

¹SE: standard error.

²Breeding female: female that kidded at least once.

³Rearing female: prepubertal female.

⁴Female kid: birth to six months of age.

Table 3: Overall goat flock reproductive performances and productivity (mean \pm SE) among goat flocks during the period 1999/2000.

Productivity indices	¹ N	Mean \pm SE
Age at first kidding (months)	275	10.2 \pm 0.22
² Prolificacy	312	1.9 \pm 0.02
³ Fecundity	312	1.8 \pm 0.03
Pre-weaning survivability (percent)	314	86.5 \pm 0.97
Kid weaning age (months)	280	4.7 \pm 0.11
⁴ Pre-weaning mortality (percent)	313	13.5 \pm 0.98
⁵ Post-weaning mortality (percent)	308	4.2 \pm 0.64

¹N = total number of respondents.

²Prolificacy: total number of kids per doe kidding per year.

³Fecundity: total number of kids born alive per doe kidding.

⁴Pre-weaning mortality: kid mortality from birth to 6 months.

⁵Post-weaning mortality: kid mortality after 6 months of birth.

Flock dynamics and marketing

At least three goats were slaughtered while two were sold per household during a period of 12 months preceding the study (Table 4). Marketing was informal and the main reason for selling goats was to generate immediate cash for various uses such as children's school fees and crop inputs e.g., fertiliser and seed. Furthermore, sales were highest and most lucrative during the festive seasons. There was minimal inflow (goats-in) or outflow (goats-out) of goats < 2 goats/household) within flocks.

Table 4: Overall mean (\pm SE) flock dynamics per household during the 12 months preceding the study period 1999/2000.

Variable	Mean \pm SE
¹ Flock size	10.0 \pm 0.70
² Present flock size	11.8 \pm 0.70
Goat purchases	0.5 \pm 0.12
Goat sales	1.7 \pm 0.16
Goat slaughters	3.0 \pm 0.21
Number of kids born	5.3 \pm 0.34
Losses	2.4 \pm 0.21

Total number of respondents = 317.

¹Flock size: number of goats at the beginning of the study.

²Present flock size: number of goats in the flock during the study.

Discussion

The Mashona goat is a small, compact and hardy breed. It has a multiplicity of colours and is a prototype of the Small East African goat (Mason and Maule, 1965). The height at the withers is on average 50 cm and the mature mass is 25 to 30 kg (Koschella, 1989; Sikhosana, 1992). High prolificacy and a complete lack of seasonality (Llwelyn, *et al.*, 1992) characterise the reproduction of this goat. Despite the high fertility (Kusina, *et al.*, 2000a, 2001) and hardiness, the small size of the Mashona militates against good pricing especially where marketing is based on carcass weight. As a result, the majority of the farmers in this study expressed great interest in the idea of cross breeding the Mashona goat does with a bigger breed, in particular, the Boer goat.

The Boer goat is a large framed meaty breed characterised by high growth rate and good fertility (Greyling, 2000). This breed has generated considerable interest for cross breeding by both communal and smallscale farmers in Zimbabwe. The main purpose of cross breeding with the Boer is to "upgrade" the size of the indigenous goats to improve the yield and quality of the carcass, thereby improving the potential revenue generated from formal marketing (Kusina and Kusina, 2000). However, the performance of Boer goat progeny under smallholder farmer management in Zimbabwe has been reported to be very poor due to high preweaning kid mortality as a result of poor nutritional management and limited veterinary support (CARD, 1992).

In this study, the authors recommend that cross breeding the Mashona goat with another local breed called the Matebele goat would be the most ideal and sustainable strategy for smallholder farmers. Although a prototype of the Small East Africa goat, the Matebele goat is larger than the Mashona goat and has a good meat conformation and carcass characteristics similar to those of the Boer goat (Sikhosana, 1992). In addition, the Matebele goat has good fertility; good growth

rates and is better adapted to the harsh nutritional and disease challenges goats face under smallholder management in Zimbabwe (Sibanda, *et al.*, 1997, 1998) when compared to the Boer goat. The latter requires good feeding management and veterinary attention, both of which the resource-poor farmers cannot afford (Kusina, *et al.*, 2000b).

The management systems observed in this study are similar to the systems practised by other smallholder farmers in crop-livestock farming systems in most sub-Saharan African countries (ILRI, 1998). The management systems vary with the type of farming system and the season. Generally, in sedentary crop-livestock farming systems, as was the case in this study, goats are herded during the cropping season. However, where labour is inadequate, priority is given to cropping enterprises. As a result, some farmers are forced to tether their goats (Shumba, 1984; Hale, 1986; Kusina and Kusina, 1998; Chikura, 1999). Similar practises have been reported elsewhere in Africa, for example, in Tanzania (Kakengi, *et al.*, 2000) and Nigeria (Ogebe, *et al.*, 2000). Tethering of goats during the cropping season is a strategy to prevent crop damage by the goats as well as to avoid conflicts with neighbouring farming households. However, in this study, a few farmers (7 percent) tethered their goats during the cropping season. Instead, herding was the most common management system practised.

On average, each household had five does (breeding females), two rearing females (prepubertal females) and a buck with very few castrated and rearing males. Chikura (1999) reported similar findings from a smallholder crop-livestock farming area in Wedza. This can be attributed to the fact that most households easily dispose of "excess males". As a result, castrates constitute the bulk of sale stock when the farmer voluntarily sells goats.

The observation by farmers that the kidding pattern exhibited two distinct peaks corroborates earlier findings elsewhere in Zimbabwe (Chikura, 1999; Kusina, 2000). In both cases, nutrition of the does appears to have been the critical signal for active ovarian activity in the goat flocks. In this study, does that kidded in September/October were presumed to have conceived in April/May and those kidding in March/April will have conceived in October/November, a time when the grass has rejuvenated (Kusina and Kusina, 1998). Both events at the time of conception coincide with optimal feed availability and quality. For example, during the period April/May, goats start to range freely in the grazing areas. This also allows for an opportunity for those flocks without bucks to get access to bucks thereby increasing chances of breeding. The increased access to abundant feed as the goats free range has been postulated to induce ovulation and enhance fertility of the does (Kusina, *et al.*, 2001).

One major finding from this study was that goat health was not a major limitation to production. This was a surprise. Nonetheless, the observation gets credence from the exceptionally high survivability of pre-weaning kids that approximated 87 percent. This might be partly attributed to the very low pre-weaning kid mortality. However, this should be taken with caution as it is in

contrast with several research findings in Zimbabwe and other southern African countries where pre-weaning kid mortality has been reported to vary from 20 to 65 percent (CARD, 1992; Kusina, *et al.*, 1999). There is, therefore, need for research to verify this observation. Notwithstanding the reported high survivability, some farmers indicated that during the wet season, sometimes goats suffered from foot rot, diarrhoea, pneumonia, orf and were infected by internal parasites. Under smallholder management systems, generally, such diseases are indicative of sub-standard housing provision for the goats. This was confirmed by the preponderance of open-roofed or leaky goat housing or corrals that exposed the goats to muddy conditions during the wet season. The latter predisposed them to foot rot, pneumonia and internal parasites. Provision of roofing on goat houses would reduce the exposure of goats to the adverse vagaries of nature as demonstrated by Matika and Sibanda (1993) who observed a 50 percent increase in pre-weaning kid survival through providing thatched roof and raised floors in goat houses (Kusina, *et al.*, 2000b). In addition, provision of protective goat housing will reduce losses through theft and predation. In this study, approximately six goats were lost per household *per annum* due to predation and theft.

In the study, it was found that goat sales were driven by the desire to generate immediate cash. However, the major constraints faced by the farmers were small flock sizes and the absence of a ready market. The situation was aggravated by low prices offered for the goats on the available informal market. To avert the problem of small flock numbers for sale, farmers are advised to engage in group marketing and exploit volume of sale to defray transport costs. This approach should be organised at community level whereby goats can be marketed through advertised auctions. This marketing strategy might benefit the goat producers instead of the bargaining tactics commonly practised in informal marketing.

Conclusion

The results of this study indicated that goat flock sizes were small and the dominant breed was the Mashona. Farmers were interested in improving the Mashona goat through cross breeding with the Boer bucks to improve the size of the Mashona goat.

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